# Teaching

## Lectures

1. **Mathematics for Physicists IV** (4 weekly hours, summer 1999)
2. **Semi-Riemannian Geometry** (2 weekly hours, summer 2001)
3. **Linear Algebra** (2 weekly hours, winter 2001/02)
4. **Geometric Topology** (2 weekly hours, summer 2002)
5. **Linear Algebra for Engineers** (2 weekly hours, winter 2002/03)
6. **Analysis II for Engineers** (4 weekly hours, summer 2003)
7. **Linear Algebra** (2 weekly hours, winter 2003/04)
8. **Analysis II for Engineers** (4 weekly hours, summer 2004)
9. **Ordinary and Partial Differential Equations** (2 weekly hours, summer 2004)
10. **Intensive course in Mathematics for Engineers** (4 weekly hours, winter 2005/06)
11. **Analysis I for Engineers** (4 weekly hours, summer 2006)
12. **Linear Algebra for Engineers** (2 weekly hours, winter 2006/07)
13. **Analysis I for Engineers** (4 weekly hours, summer 2007)
14. **Mathematics for Physicists I** (4 weekly hours, winter 2007/08)
15. **Mathematics for Physicists II** (4 weekly hours, summer 2008)
16. **Mathematics for Physicists III** (4 weekly hours, winter 2008/09)
17. **Aspects of Semi-Riemannian Geometry** (2 weekly hours, winter 2008/09)
18. **Mathematics for Physicists IV** (4 weekly hours, summer 2009)
19. **Linear Algebra for Engineers** (2 weekly hours, winter 2009/10)
20. **Analysis I for Engineers** (4 weekly hours, summer 2010)
21. **Mathematics for Physicists III** (4 weekly hours, winter 2010/11)
22. **Mathematics for Physicists IV** (4 weekly hours, summer 2011)
23. **Mathematics for Physicists III** (4 weekly hours, winter 2011/12)
24. **Mathematics for Physicists I** (4 weekly hours, winter 2011/12)

## Seminars

1. Winter 1998/99: **Geometrical Foundations of Mathematical Physics**
2. Summer 1999: **Geometrodynamics**
3. Winter 1999/2000: **Quantum Field Theory in Curved Spacetimes**
4. Summer 2000: **Spinors and Twistors**
5. Winter 2000/01: **Quantum Information Theory**
6. Summer 2001: **Einstein-Cartan Geometry**
7. Winter 2001/02: **Semi-Riemannian Geometry and Relativity**
8. Summer 2004: **Differential Equations**
9. Summer 2009: **Hamiltonian Formalism and Dynamical Constraints**
10. Since winter 2004/05 every semester: **Differential Geometry (research seminar)**
11. Since winter 2006/07 every semester: **Differential Geometry (student seminar)**

---

# Supervision of Doctoral and Diploma Theses

1. **Über eine Vermutung zu scherungsfreien idealen Fluiden in der Allgemeinen Relativitätstheorie** by Frank Klich (diploma thesis at the Department of Theoretical Physics), 2002, with Prof. Hellwig, finished
2. **Vergleich verschiedener Herleitungsmethoden für die Petrow-Klassifikation** by Frank Drautz (diploma thesis at the Department of Mathematics), 2003, with Prof. U. Simon, finished
3. **Zur Chern-Vermutung über isoparametrische Hyperflächen in Sphären** by Simon Weiss (diploma thesis at the Department of Mathematics), 2008, with Prof. U. Pinkall, finished
4. **Über konforme Vektorfelder in der Mathematischen Kosmologie** by Alexander Dirmeier (diploma thesis at the Department of Mathematics in collaboration with the Department of Theoretical Physics), 2008, with Prof. H.-H. v. Borzeszkowski, finished

5. **On the Visualization of Geometric Properties of Particular Spacetimes** by Torsten Schönfeld (diploma thesis at the Department of Mathematics in collaboration with the Department of Theoretical Physics), 2008, finished

6. **Killing fields of particular Lorentzian metrics** by Christian Reiher (diploma thesis at the Department of Mathematics), 2009, finished

7. **Modelling of stochastic processes via particular 2-dimensional Lorentzian manifolds** by Isabel Kramer (diploma thesis at the Department of Mathematics), 2009, finished

8. **Differential geometric methods in the theory of gravitational lensing and the "odd number theorem"** by Senja Barthel (diploma thesis at the Department of Mathematics), 2009, finished

9. **Fermi coordinates and their applications in differential geometry** by Stefan Ullrich (diploma thesis at the Department of Mathematics), 2010, finished

10. **The Poincaré recurrence theorem and its applications** by Klaus Krause (bachelor thesis at the Department of Mathematics), 2010, finished

11. **Isoparametric hypersurfaces and their applications to special geometries**, by Firouz Khezri (master thesis within the Berlin Mathematical School), 2010, finished

12. **Mathematical Aspects of Einstein's Field Equations** by Tobias Neumerkel (bachelor thesis at the Department of Mathematics), 2010, finished

13. **Zermelo's Navigation Problem** by Anton Kolleck (bachelor thesis at the Department of Mathematics), 2010, finished

14. **Invariant Representation of the Covariant Derivative of the Oberver Field** by Ivo Vogt (bachelor thesis at the Department of Mathematics), 2011, finished

15. **Differential Geometric Formulation of the Maxwell Equations** by Timur Shaykhutdinov (bachelor thesis at the Department of Mathematics), 2011, finished

16. **Metrics on Lorentzian Cylinders** by Louanne v. Brochwitz (diploma thesis at the Department of Mathematics)

17. **The Theorem of Gauß–Bonnet: Different Proofs** by Yasemin Dönmez (diploma thesis at the Department of Mathematics)

18. **New Proofs of the Hairy-Ball Theorem** by Katrin Rosentritt (master thesis at the Department of Mathematics)

19. **Properties of Lindelöf Spaces** by Klaus Krause (master thesis at the Department of Mathematics)

20. **On Differential Geometric Aspects of Ori Spacetimes** by Jürgen Dietz (diploma thesis at the Department of Mathematics)

21. **Contributions on the Chern conjecture for isoparametric hypersurfaces in spheres** by Simon Weiß (doctoral thesis at the Department of Mathematics), 2011, finished

22. **On Time-Oriented Lorentzian Manifolds with Applications to Relativity Theory** by Matthias Plaue (doctoral thesis at the Department of Mathematics)

23. **Analysis and Construction of new 4-Manifolds** by Alexander Dirmeier (doctoral thesis at the Department of Mathematics)

## Tutorials and examination courses

**24 courses**:

- Winter 1997/98 - summer 1999: lecture series **Mathematics for Physicists I-IV**
- Winter 1997/98 - winter 1998/99: **Mathematics for Engineers I and II**
- Winter 1999/2000 - summer 2001: lecture series **Mathematics for Physicists I-IV**
- Winter 2001/02 - winter 2002/03: **Mathematics for Physicists I-III**
- Winter 2003/04: **Linear Algebra for Engineers**
- Summer 2005: **Complex Analysis**
- Winter 2006/07: **Computer aided Linear Algebra**
- Additional seminars on **general topology**, **analysis**, **algebraic topology**, and many other topics